UNITED
NATIONS

TD

United Nations Conference
on Trade and Development

Distr.
GENERAL

TD/B/39(1)/7
25 August 1992

Original: ENGLISH

TRADE AND DEVELOPMENT BOARD
Thirty-ninth session
First part
Geneva, 28 September 1992
Item 5 of the provisional agenda

SUSTAINABLE DEVELOPMENT INCLUDING UNCTAD'S CONTRIBUTION TO THE IMPLEMENTATION OF UNCED'S CONCLUSIONS AND RECOMMENDATIONS

Sustainable development: a consideration of sectoral links

Report by the UNCTAD secretariat

CONTENTS

Chapter		Paragraphs
	Introduction	1 - 5
I.	Cross-sectoral issues	6 - 9
	Policy principles	6 - 7
	Tradeable permits	8
	Poverty	9
II.	Sectoral links	10 - 71
	A. Commodities	11 - 35
	Mining	13 - 15
	Fisheries	16 - 20
	Forestry: tropical timber	21 - 25
	Agriculture	26 - 32
	Future work	33 - 35

GE.92-52046/4840B (E)

CONTENTS (continued)

		Paragraphs
B.	Industry and other sectors	36 - 59
	Environmental protection and competitiveness	42 - 45
	Trends in product policies	46 - 53
	Future work on trade and environment	54 - 59
C.	Energy policy and tradeable emission entitlements	60 - 69
	The policy conundrum	60 - 62
	The case for tradeable emission entitlements	63 - 65
	Other market-based instruments	66 - 67
	Future work	68 - 69
D.	Promoting the transfer, adaptation and generation of environmentally sound technologies (ESTs)	70 - 71

INTRODUCTION

1. The Board, in its decision 384 (XXXVII), paragraph 5, requested:

> The Secretary-General of UNCTAD, taking into account studies undertaken in other appropriate fora, to prepare an analysis, if possible for the first part of the thirty-eighth session of the Trade and Development Board, of the issue of sustainable development, in particular the reduction of poverty and its interface with policies and mechanisms in environmentally sensitive sectors, such as agriculture, energy, industry and transport, as well as with relevant structural policies such as those relating to the enterprise sector.

As a first response, the Board had before it, at the first part of its thirty-eighth session, a report by the secretariat entitled Policies and mechanisms for achieving sustainable development (TD/B/1304). The elements raised in the above decision are numerous and complex, and the report did not attempt to cover all of them or to treat them exhaustively. It focused on an analysis of policies and mechanisms, and it stated that the secretariat was pursuing work on the questions raised in the decision.

2. In paragraphs 3 and 4 of resolution 393 (XXXVIII), the Board, having considered that the report in TD/B/1304 constituted a useful analysis, requested the Secretary-General of UNCTAD to complete the analysis called for in paragraph 5 of decision 384 (XXXVII) and to provide the full report for the first part of the thirty-ninth session of the Board. Work both in UNCTAD and in other fora has flourished in the time which has passed since the first part of the thirty-eighth session of the Board, largely within the context of the UNCED process. It would be impossible within the scope of the present report to synthesize or catalogue this extensive work. The present document is intended as a progress report describing work the UNCTAD secretariat has pursued over the last year within its mandate to contribute to the elaboration of innovative thinking and increased awareness in the area of environmental development economics (decision 384 (XXXVII), para. 3). This report does not cover the material already presented in TD/B/1304.

3. Since the first part of the thirty-eighth session of the Trade and Development Board, UNCTAD VIII and the United Nations Conference on Environment and Development have taken place. Both have far-reaching implications for UNCTAD's work on sustainable development. It is therefore not only possible but above all desirable to focus the response contained in the present report on those issues within the scope of decision 384 (XXXVII), paragraph 5 which fall within the new role assigned to UNCTAD by the Cartagena Commitment and Agenda 21 and already reflected in the new structure of UNCTAD's intergovernmental machinery.

4. The UNCTAD secretariat has prepared, for the consideration of the executive session of the Trade and Development Board (21 September 1992), a discussion note on UNCTAD's follow-up to the outcome of the United Nations Conference on Environment and Development. That note (TD/B/EX(1)/2) deals with orientations for UNCTAD's future work and possible institutional arrangements within UNCTAD in response to paragraph 63 (5) of the Cartagena Commitment.

5. The text which follows relfects those aspects of UNCTAD's work most specifically related to sustainable development. Chapter I refers briefly to some cross-sectoral issues particularly important to UNCTAD's present and future work on sustainable development. Chapter II explains in more detail a number of sectoral links pertinent to decision 384 (XXXVII), paragraph 5, on which UNCTAD's work over the last few months has shed particular light. The activities described in that chapter leave open the possibility of taking up further issues within its broad mandate to contribute to the elaboration of innovative thinking and increased awareness in the area of environmental development economics. This brief report illustrates how environmental and sustainable development issues raise new challenges and new opportunities for international deliberations within UNCTAD's traditional field of trade and development.

I. Cross-sectoral issues

Policy principles

6. Chapter I of Policies and mechanisms for achieving sustainable development (TD/B/1304) contained a general discussion of different types of policy and mechanism and of the circumstances in which they could most appropriately be applied. The secretariat has been pursuing work on one major aspect of this question: the developmental implications of three basic principles of environmental policy - the polluter-pays principle, the user-pays principle and the precautionary principle. 1/ These principles are relevant to every sector mentioned in decision 384 (XXXVII), paragraph 5, and in the Cartagena Commitment, paragraph 42. References to each of them appear in the Rio Declaration on Environment and Development. Since they appear in this statement of basic principles, they are all the more likely to count as factors in international environmental negotiations in years to come.

7. Apart from contributing to and indeed stimulating reflection on the implications of these principles for developing countries and their international trade, the UNCTAD study is already providing an input into the technical assistance activities on developmental aspects in relation to ongoing deliberations on environmental issues which the Board requested in resolution 393 (XXXVIII), paragraph 8.

Tradeable permits

8. UNCTAD's proposal for a system of tradeable carbon emission entitlements is outlined in chapter II. Tradeable permits, however, need not be restricted to carbon emission. They can be applied to other activities like fishing or the emission of pollutants into water. The interest of such a mechanism extends to a number of sectors. UNCTAD may be called upon to pursue its application in further sectors.

Poverty

9. The Cartagena Commitment declares that "persistent poverty, which is particularly acute in many developing countries, is unacceptable": 2/ it notes that "a consensus has developed on a number of priority aspects of development, including the eradication of poverty". 3/ UNCTAD's work on sustainable development has always emphasized the central objective of reducing poverty. The Cartagena Commitment gives poverty reduction and alleviation a prominence independent of sustainable development and thus underlines the importance of integrating it into all aspects of UNCTAD's work. The Board has established a Standing Committee on Poverty Alleviation, the task of which is "to contribute to national and international efforts to prevent, alleviate and reduce poverty" and which should inter alia "identify the linkages between the alleviation of poverty and the achievement of sustainable development". 4/ It will further focus and stimulate UNCTAD's concern for this issue.

II. Sectoral links

10. TD/B/1304 focused on one of the sectors enumerated in Board decision 384 (XXXVII), paragraph 5 - transport - to demonstrate the interface between sectoral policies and mechanisms on the one hand and sustainable development, including the reduction of poverty in particular, on the other. A general conclusion was that in the perspective of sustainable development and poverty reduction, the solution to environmental problems which arise within particular sectors must be sought beyond sectoral boundaries. That basic point being taken as read, this chapter refers to other aspects of the sectoral interfaces explored by the secretariat's ongoing work on sustainable development in particular sectors.

A. Commodities

11. Commodity production involves the exploitation of agricultural, forestry, fishing and mineral, including energy, resources. In the developing countries, the basic issue is to eradicate poverty and to increase employment and exports while preserving and protecting the environment. In the developed countries, which are responsible for most of the global pollution, the challenge is to restore the environment while maintaining, as much as possible, lifestyles and productive activities. The commodity sector is inextricably linked with the achievement of these goals because mineral, fishery and forestry resources are natural resources in themselves and agriculture, the largest source of commodity production, fundamentally depends on the use of natural resources, in particular land, water, air, climate and fertilizers.

12. A set of four studies has been conducted by the UNCTAD secretariat on the links between the commodity sector and the environment with respect to mining, fisheries, forestry and agriculture. 5/ The findings indicate the complexities and multi-dimensional nature of these links. The studies will be published in early 1993. The issue of the management of natural resources in the context of sustainable development is also discussed in a report by the Secretary-General of UNCTAD to the forty-seventh session of the General Assembly. 6/

Mining

13. Pollution and the need for land rehabilitation are the principal environmental effects of mining operations. In most cases, the area covered by environmental damage is comparatively small but the effects are important because of their intensity and severity. These effects can be transported to other areas by rivers, seas, or wind. Moreover, poor environmental practices can negatively affect the health of the mining communities.

14. Measures such as charges, taxes and other regulations requiring mining firms to act in a specified manner, for example to rehabilitate land, can entail additional costs. It has been estimated that increasingly stricter environmental regulations may add up to 15 per cent, in real terms, to the

cost of copper production and 12 per cent to that of aluminum by 1995. Stricter environmental regulations may also act as a barrier to entry to the industry, since transnational companies that are already operating in countries with strict regulations are likely to have the technology to meet such regulations, whereas prospective new entrants and small firms may not have access to the required technology.

15. On the other hand, environmental protection does not always involve higher costs. Productive efficiency often leads to environmental efficiency, as well as being a prerequisite for it. For example, recently installed bacterial leaching in Chile prevents acid water pollution and at the same time allows lower grade ores to be mined. Similarly, cost savings have been realized in the aluminium industry when measures were introduced to reduce fluoride emissions.

Fisheries

16. Over the last 20 years, the annual world catch of aquatic resources has increased from less than 70 million tons to about 100 million tons. In line with this growth, over-use of marine resources and only limited appreciation of their complex interdependence has resulted in inadequate conservation and resource management, leading to depletion. Biological degradation and disturbances of the delicate food chains have also caused significant harm to fish stocks. Globally, the average annual fish catch is just below the estimated sustainable yield. However, in several of the world's major fisheries (Pacific Northwest, the Mediterranean and the Black Sea, the Eastern Indian Ocean, and Southeast Pacific) sustainable yields have been surpassed.

17. The utilization of drift nets, which is being increasingly restricted, has been an important element in the threat to the aquatic environment and its biological diversity. In this regard, fishing legislation is changing in many places, for example in Oman and the European Community, allowing only nets with bigger mesh sizes than before.

18. In recent years, aquaculture has been providing an increasing part of world fish supplies, with 80 per cent of the reported aquaculture products coming from Asia. While this contributes to the preservation of marine fisheries, it brings its own environmental problems. In shrimp farming, for example, these include the clearing of mangroves, extensive harvesting of wild larvae and indiscriminate use of antibiotics.

19. At the end of the 1970s, the extension of national jurisdiction over fishery resources to Exclusive Economic Zones (EEZ) extending 200 miles gave coastal States the opportunity to develop and to manage fisheries in their interest rather than having to compete with other nations for a share of the resources lying off their coast. This should have contributed significantly to the sustainability of the resource base, but this has not occurred specifically in developing countries because of poor research data, inadequate resource monitoring, and absence of control and surveillance capabilities, as well as lack of sufficient trained personnel and an ever-pressing need for hard currency from their natural resources.

20. International fisheries cooperation agreements and joint fishing ventures have the potential to improve the management of world fishery resources. However, only a few of them address conservation and resource management issues and include sufficient incentives in this regard. They often emphasize foreign fishing rights and quick monetary compensation schedules, rather than coastal countries' resource conservation and management concerns. Recent initiatives to improve the developing countries' performances in this regard include the intention of ECOWAS to harmonize the international fishery cooperation policies of 13 member States and to introduce coordinated aquatic resource conservation measures at the subregional level.

Forestry: Tropical timber

21. Tropical forests are mostly located in the developing countries. They are almost entirely natural forests, and the annual rate of deforestation, which increased by about 50 per cent between 1980 and 1990, is currently estimated at around 17 million hectares.

22. Tropical forests are a valuable and renewable natural resource which can serve as a basis for the development efforts of many developing countries. In addition, they attract global interest inasmuch as they act as a carbon sink and as a repository of biodiversity and genetic heritage.

23. Global tropical forest loss as a result of logging is a relatively minor part of total deforestation. Close to two thirds of deforestation is attributable to the conversion of forest land to agriculture. The more profitable the exploitation of timber, the less likely its conversion to other uses and the more important becomes sustainability and preservation of the resource base for the owners of the forest. Increased productivity in agriculture may also help in forest conservation by reducing the need for additional land.

24. Although relatively small on a global scale, damage to tropical forest resources caused by commercial logging of natural forests is very important locally and nationally. This damage and the actual forest loss is considerably bigger than the wood volume extracted from the forest. For example, it has been estimated that almost six times more trees are damaged than are felled for timber during extraction operations of commercially favoured species. Guidelines exist for reducing this damage, but implementation is constrained by the institutional weaknesses in the forestry departments of many developing countries.

25. The institutional organization of logging from natural forests is based on the concession system. Sometimes the duration of concessions is much shorter than forest rotation. In such cases, the firms have little interest in the sustainability of the forest resources and even less so in biodiversity and the maintenance of the balance of the ecosystems. Although the terms of the concession may stipulate that certain logging practices be used and specify the loggers' obligation for post-harvest treatment, the enforcement of

these conditions is often inadequate. It may be preferable to have concessions extending over longer periods of time or to have extensions based on performance. Improving the control and enforcement capacities of forestry departments is also crucial.

Agriculture

26. In recent years the development of agricultural production has been characterized by the replacement on an ever-greater scale of human labour and natural biological processes by the use of inputs of a non-agricultural origin. Mechanization, artificial fertilizers and the use of plant protecting agents and herbicides are now increasingly decisive in determining the level of agricultural output. As a result, agricultural production contributes to environmental damage through, for example, pollution due to over and mis-application of external inputs such as chemical fertilizers and pesticides and through the depletion of natural resources as a result of erosion or the degradation of soil.

27. Successful policies will need to focus on soil management. In sub-Saharan Africa, grain yields average about a third of those in East Asia. Differences in land quality are part of the reason, but so too is sub-Saharan Africa's low fertilizer use - less than one-fifth of East Asia's average. In the developing world, low use rates and the consequent decline in soil nutrients are far greater problems than excessive and poorly managed fertilizer applications. 7/ On the other hand, given possible negative environmental consequences associated with over-intensive use of fertilizers, it is important to assess whether, and to what extent, alternative farming systems can be introduced that still maintain or increase agricultural output. The use of biological processes for fertilization - nitrogen-fixing plants, crop rotations, use of trees as "nutrient pumps", and recycling of organic waste - could be extended far beyond current levels.

28. Pesticides differ with regard to their level of toxicity and their level of environmental persistence. Twelve of the world's most hazardous pesticides, known as the "dirty dozen", are banned or severely restricted in industrialized countries but continue to be used in many developing countries. In response to overuse of pesticides, they are now being formulated, as far as possible, to target particular pests. Their toxic life has been made shorter to reduce accumulation in the environment. Some Governments are eliminating subsidies for pesticides or are even taxing them, thus signaling to farmers that pesticide use has environmental as well as financial costs. 8/

29. After some decades of the green revolution and "chemicalization" and "industrialization" of agriculture, environmental issues are gaining importance on the agronomical research agenda. At the frontier of agricultural technology, many traditional techniques for sustainable agriculture are being reevaluated and supplemented with innovative elements. The intention is to replace chemical technology with management skills. Increasing attention is also being given to bioengineering of crop varieties

and the development of non-chemical forms of pest management, biodegradable pesticides, integrated plant nutrition systems with "green" fertilizers to replace partially chemical fertilizers, introduction of low-input varieties, mulching, integration of cultivation, grazing and forestry (agro-forestry), and optimization of irrigation techniques so that better use is made of available water resources. The experience of China since 1985 with eco-farming has been highly encouraging. 9/ Agronomic and agrobiological knowledge on these issues is growing quickly and there is much scope for cooperation among developing countries.

30. Traditionally the trade and environment debate with regard to the agricultural sector has focused on what the environmental impact of trade liberalization would be through its impacts on production and standard setting. 10/ It has now been recognized that attention should also be given to the environmental impacts of existing trade distortions. As has been mentioned in a recent OECD 11/ report, "trade liberalization can have environmental benefits in removing trade policy distortions that cause environmental degradation and by improving the efficient allocation of the world's resources". This would particularly be the case in the agricultural sector. In this context, Agenda 21 refers to the need to "encourage, in the context of achieving sustainable agricultural development and consistent with relevant internationally agreed principles on trade and environment, a more open and non-discriminatory trading system and the avoidance of unjustified trade barriers which together with other policies will facilitate the further integration of agricultural and environmental policies so as to make them mutually supportive" (para. 14.11).

31. In some cases plans or policies aimed at reducing agricultural overproduction in the developed countries have been linked to environmental issues. Proposals have been made in the EC to reduce subsidies - which tend to lead to overproduction - while maintaining rural populations needed to manage the land in environmentally sensitive areas. A support system based on area cultivated might be "given an environmental dimension by incorporating inducements to limit chemical inputs, yields or animal density which would vary from region to region according to carrying capacity". 12/

32. In Sweden, one of the objectives of the reform under the agricultural policy established in the spring of 1990, which included the lifting of price controls and export subsidies, has been to improve the environment. 13/

Future work

33. Ensuring optimal use of natural resources would seem to require new instruments which would provide incentives for environmentally preferable practices and disincentives for others. These instruments may be regulatory or market-based. As information needed for assessing environmental damage due to commodity production is scant, data collection and analysis from the local to the global levels is a prerequisite for policies, both regulatory and market-based

34. At its eighth session, the United Nations Conference on Trade and Development identified some subjects which could be pursued in the area of natural resource management and sustainable development (Cartagena Commitment, para. 208). These are:

(a) The manner in which prices of natural commodities and their synthetic competitors could reflect environmental costs and resource values;

(b) The means by which the competitiveness of natural products with environmental advantages could be improved;

(c) The ways by which development of the commodity sector, including through diversification, and environmental concerns could be made mutually reinforcing;

(d) Additional international financial and technical support to developing countries for the development and dissemination of technologies to cope with environmental problems that are specific to commodity production and processing.

35. These issues are also reflected in the Agenda 21 adopted at the United Nations Conference on Environment and Development, in whose implementation UNCTAD is to be involved, "taking into account the importance of the interrelationship between development, international trade and environment and in accordance with its mandate in the area of sustainable development". 14/ In this regard, it is recalled that the Board, in deciding upon the terms of reference for the Standing Committee on Commodities in May of this year, called upon the Standing Committee to explore "the links between commodity policies, sound management of natural resources and achievement of sustainable development". 15/

B. Industry and other sectors

36. Sustainable industrial development requires the reduction of pollution and of the resource intensity of industrial production. While progress has been made in reducing pollution in the developed countries, 16/ it would appear that pollution intensity has grown in developing countries. 17/ Pollution-intensive, resource-based industries are growing fastest in developing countries. 18/ Empirical studies show that as industrial output increases, the share of output from dirty industry tends to increase in low-income countries, but to decrease at higher levels of per capita income (the inverted "U" curve).

37. Strategies for sustainable development include, inter alia, the establishment of environmental regulations and standards and the effective use of economic instruments. UNCTAD's work on policies and mechanisms for sustainable development is pertinent in this context.

38. In the area of trade issues, of special interest are the role of trade in determining economic activity and patterns of industrialization and the effects of sustainable development policies on international competition and trade. Research has concentrated on the pollution and resource intensity of industrial trade flows and the relationships between openness (in terms of liberalization of trade regimes and investment), competitiveness and sustainablity. Research on these issues in UNCTAD will concentrate on country case case studies. The impact of environmental concerns and measures in overseas markets on developing countries and the role of investment and technology policies in meeting with environmental standards in the major markets and in anticipating changes in consumer preferences and environmental regulations in these markets will also be analysed. 19/

39. Trade policy analysts, particularly in developing countries, are concerned that environmental protection is used as an excuse to impose trade barriers that are in reality meant to protect a domestic industry from import competition. While studies to date have not found that environmental policies cause significant international trade distortions, the potential for trade distortion is growing, which may particularly affect the developing countries. It is therefore important to analyse and monitor how environmental rules and regulations affect trade, and to examine ways of preventing these environmental measures from becoming trade barriers.

40. Apart from the question of compatibility between environmental protection measures and international trade rules, a likely development in the major markets will be an increased demand for environmentally friendlier products, which will trigger off wide-ranging innovation in order to reduce the use of hazardous substances, attain tighter energy efficiency standards, ensure that products (especially packaging materials) are made of materials suitable for recycling or reuse, reduce the material content of products to minimize waste, etc. Product-specific measures are increasingly being used to contribute to the achievement of environmental purposes. Examples can be found in Agenda 21 (see box 1 below).

41. In any case, efficient production as well as concern for environmental factors will increasingly become a factor of international competitiveness and a requisite for maintaining and where possible increasing market shares. The relationship between environmental protection and competitiveness and trends in product-oriented policies are briefly analysed in this section.

Environmental protection and competitiveness

42. An important trade issue is the effect of environmental protection on industrial competitiveness. Environmental policies can diminish competitiveness if the need to comply with environmental standards results in significantly increased production costs. Conversely, environmental protection induces technological innovation which may result in increased competitiveness. 20/

43. A distinction should be made between production standards and product standards. Production standards (related to production externalities), in as far as they increase production costs, would favour imports over domestic production. 21/ Entrepreneurs in countries with high standards may perceive themselves to be at a cost disadvantage, and seek to "level the competitive playing fields". They may ask for subsidies, which in turn may result in trade distortions and trade tensions, including requests for countervailing duties.

44. Some differentiation of standards - in accordance with prevailing national or local conditions in developing countries, especially assimilation capacities and social values - is justified and a more efficient way to protect the environment. According to this argument, economists will consider requests for harmonization of production standards as protectionist, especially when domestic environmental problems are addressed. Under the proposition that standards can differ between countries, differences in standards per se cannot be a basis for trade restraints. In any case, in practice it would be difficult to show injury, as the actual costs of investment necessary to comply with environmental standards, which can be written off over a period of several years, per unit of production in a given year will normally be quite low and in most cases below the "de minimus" provisions of existing unfair trade laws.

45. In the case of product standards (related to consumption externalities) higher standards may, in practice, be designed in such a way as to give a competitive advantage to the country imposing the standard, in as far as foreign competitors have to incur higher costs in order to comply with the standards. 22/ GATT, particularly through the Agreement on Technical Barriers to Trade, seeks to prevent standards from becoming barriers to trade.

Trends in product policies

46. It will be particularly relevant to developing countries to ensure that their export development policies are drawn up in the knowledge of the environmental requirements of their major markets. New trends are emerging in environmental policies, particularly in developed countries, aimed at substantially increasing resource and energy efficiency. The importance of product-oriented policies is increasing. UNCTAD's Trade Control Measures Information Data Base will provide information on product-specific policy measures, such as economic instruments, standards and regulations, and ecolabelling requirements. Trends in product policies have been the subject of debate in expert group meetings convened by UNCTAD. 23/

Box 1. Product measures and Agenda 21

Agenda 21 refers to a number of product-related environmental policy measures. Some examples are given below.

Waste reduction	"Governments, together with industry, households and the public, should make concerted efforts to reduce the generation of wastes and waste products in the following ways: (a) encourage recycling in industrial processes and at the consumed level; (b) reduce wasteful packaging of products; and (c) encourage the introduction of more environmentally sound products" (para. 4.19)
Economic instruments	"Some progress has begun in the use of appropriate economic instruments to influence consumer behaviour. These instruments include environmental charges and taxes, deposit/refund systems and other price-related economic instruments. This process should be encouraged in the light of country-specific conditions" (para. 4.25) All countries should ... "Promote the use of economic instruments, such as product charges, to discourage the use of construction materials that create pollution during their life cycle" (para. 7.71 (c))
Energy efficiency	Governments ... should "Establish or enhance, as appropriate, in cooperation with the private sector, labelling programmes for products to provide decision makers and consumers with information on opportunities for energy efficiency" (para. 9.9 (k))

47. Pollution levels in the area of chemicals and heavy metals will have to be reduced through the use of less hazardous alternatives that are currently being developed. This process will be assisted by recycling. Efforts are being made to significantly decrease the volume of waste and to improve product composition in a way that will result in either less waste or wastes that are easier to break into component parts.

48. Concentration on environmental performance of products could lead to a switch from chemical to more natural products, as well as the development of other materials that are more environmentally friendly. Producers which are not able to meet high environmental standards or demonstrate the environmental friendliness of their products will find their competitive position deteriorating. The information requirements placed on exporting countries will pose significant problems. Such exporters, many from developing countries, will need to become involved in certification schemes or risk losing competitiveness.

49. To monitor process standards within industry, environmental auditing will emerge as an important element within firms and industries. Industry will become more responsible not only for production waste but also for product waste, e.g. packaging. Demonstrations of the environmental characteristics of products will be required to provide consumers with the necessary information about whether or not environmental standards are being met.

50. Growing attention will be given to "life-cycle analysis" which examines the cumulative impact on the environment that a product generates from the extraction of primary materials up to its final disposal. Under this approach, the product needs to be analysed at all production, transportation, use and final disposal steps to calculate the cumulative amounts of all materials, energies and pollutants. The life-cycle analysis tries to compare different products based on comprehensive environmental impact assessments and is normally used to provide a basis for awarding eco-labels for (relatively) environmentally benign products.

51. Life-cycle analysis could be used to provide information to consumers (through eco-labelling). Because of its voluntary nature, this would not create major problems with regard to international trade rules, although in practice eco-labelling can constitute an obstacle to trade. 24/ If cumulative product standards were to be introduced, there might be a high risk of certain interest groups capturing such development for protectionist purposes (see also para. 44 above).

52. The life-cycle analysis requires a very large amount of data. It obliges importers to provide information on material and energy inputs as well as production processes used in countries of origin. The feasibility of collecting such information in many developing countries may be questionable, particularly considering that in many developing countries, apart from large and medium enterprises, there tends to be a large number of small enterprises using different production and processing methods (with very different environmental impacts).

53. Paragraph 63 (5) of the Cartagena Commitment refers to the impact of production and consumption on sustainable development as one of the areas requiring attention. With regard to consumption patterns, Agenda 21 pays considerable attention to product policies and the role of information for environmentally sound purchasing decisions. Agenda 21 mentions that "the recent emergence in many countries of a more environmentally conscious consumer public, combined with increased interest on the part of some industries in providing environmentally sound consumer products is a significant development that should be encouraged. Governments and international organizations, together with the private sector, should develop criteria and methodologies for the assessment of environmental impacts and resource requirements throughout the full life cycle of products and processes. Results of those assessments should be transformed into clear indicators in order to inform consumers and decision makers" (para. 4.20). It will be important to analyse the consequences of these trends for developing country exports and to ensure that the special conditions of these countries are taken into account. It is also important to ensure transparency and compatibility with international trade rules. UNCTAD, including through the adjustment of the Trade Control Measures Data Base could contribute to these efforts.

Future work on trade and environment

54. Paragraph 63 (5) of the Cartagena Commitment, dealing with sustainable development, inter alia refers to the "interaction between trade issues and environmental protection". The need for UNCTAD to address the interlinkages between trade and environment, at both the secretariat and intergovernmental levels, is also recognized in Parts II (Broad Policy Orientations) and IV (Policies and Measures) of the Cartagena Commitment. In Part II, the Conference agreed that one of the objectives should be "(i) to contribute within its mandate to innovative thinking on the establishment of a framework for coexistence between environmental measures and international trade rules, and thus aiming at preventing the use of environmental measures for protectionist purposes" (Cartagena Commitment, para. 42).

55. In Part IV, the Conference agreed that "UNCTAD, at both the intergovernmental and the secretariat levels, taking into account the work of other relevant fora, should undertake in-depth work on the clarification of the interlinkages between trade and environment and the need for environmental protection to co-exist with liberal trade policies and free market access and contribute to consensus building with regard to appropriate principles and rules" (Cartagena Commitment, para. 154).

56. An important result of UNCED in the area of trade and environment is Chapter 2 of Agenda 21 on "International Co-operation to Accelerate Sustainable Development in Developing Countries and Related Domestic Policies". Of particular importance for UNCTAD's role in the follow-up to the Conference are programme areas (a) promoting sustainable development through trade; and (b) making trade and environment mutually supportive.

57. In response to the Cartagena Commitment and the functions Agenda 21 has assigned to UNCTAD, the secretariat has developed an extensive work programme to cover the issues relating to interlinkages between trade, environment and development, which includes policy analysis, detailed country-specific analysis and expert group meetings, involving particularly developing country research institutes and policy-makers. Extrabudgetary resources have already been provided to fund a significant part of the programme. For instance, UNDP has joined UNCTAD in undertaking two main activities, namely thematic studies of overall interest and a series of country case studies on the interactions between trade and environment policies, focusing on the economic, environmental and trade situations of specific countries. 25/ The programme will take into account work already available in GATT, OECD and other institutions. 26/

58. UNCTAD VIII also agreed that UNCTAD "should continue to collect, analyse and disseminate information on environmental regulations and measures which may have an impact on trade, especially that of developing countries" (Cartagena Commitment, para. 155). 27/ Within the Agenda 21 programme area "promoting sustainable development through trade", the UNCED Conference called for strengthening of UNCTAD's Trade Control Measures Information System (TCMIS). Data collection and research can make important contributions to the achievement of the objectives of this programme area.

59. It is expected that the data base will contribute to international transparency of national environmental regulations. Work on the data base is undertaken under the responsibility of the UNCTAD secretariat, and staff research is an important basis for data collection and analysis. In May 1992 the Secretary-General of UNCTAD sent a note to all member States containing a questionnaire on national environmental regulations which may have an impact on trade. In an annex to the questionnaire, the secretariat explained its approach to the adjustment of the Trade Control Measures Data Base. The secretariat intends to develop an information system (GREENTRADE) to facilitate dissemination of the information contained in the TCM Data Base. 28/ GREENTRADE will become a fully integrated part of UNCTAD's TRAINS system. 29/

C. Energy policy and tradeable emission entitlements 30/

The policy conundrum

60. The dynamics of global warming on one side, and the requirements of world economic growth as well as those of development on the other, appear to be on a collision course. Even in the best of the scenarios regarding a rapid introduction and dissemination of environment-friendly technologies, world industrial activity between 1990 and 2050 is likely to bring about emissions of greenhouse gases, in particular carbon dioxide, at a magnitude going well beyond the planet's absorptive capacity: (a) the exigencies of employment objectives and of consumption standards in the developed world will pose constraints on a swift reduction of carbon dioxide emissions; (b) throughout the developing world, the need is in turn for continued rapid industrialization, where the dynamics of industrialization have taken hold, as in parts of South-East Asia; a revival of industrialization, where the process has been interrupted, as in parts of Latin America; or the strengthening of an incipient process of industrialization, where the dynamics of industrialization remain weak, as in much of Africa and parts of Asia. All this implies further increases - and over time progressively larger increases - in carbon dioxide emissions if industrial processes and policies were to remain unchanged. The imperatives of global warming control and those of growth and development pull, therefore, in opposite directions.

61. The way out of this conundrum cannot simply be to exempt developing countries from participating in international efforts at emissions abatement, although this might be defendable as a first step. Developing countries account for a growing proportion of global carbon emissions, and an international agreement that did not include provision for abatement by these countries would not be able to achieve its objectives.

62. The alternative must be to seek policy approaches that meet three principal criteria. These are:

- That they be capable of bringing about the overall global abatement in emissions required by the collective judgement of the international community, basing itself on available scientific evidence;

- That they allow continued economic development in all countries, and enable the process of industrialization to proceed unimpeded in those countries in which this process is incomplete;

- That they provide appropriate incentives to ensure that industrialization in developing countries, and the replacement, renewal and expansion of industrial facilities in developed and developing countries, embody technology and practices that are emission-efficient.

The case for tradeable emission entitlements

63. Any search for a control mechanism that could be used in a broad-based international agreement to limit greenhouse gas emissions must give high priority to the need to achieve such a limitation at the lowest possible economic cost. Transferable entitlement systems meet this concern. Under such a system, entitlements allowing emissions of a certain magnitude are created and distributed to the economic actors involved. The trading of entitlements among participants would be allowed. An actor that finds himself with entitlements to less emission than is currently occurring in the area under his jurisdiction has two options. He can bring himself into conformity by cutting back on emissions until they correspond to the entitlements in his possession, bearing whatever costs that process entails. Or, he can purchase (or rent) additional entitlements from other participants, bearing whatever cost the market demands. Clearly, the actor will purchase (or rent) entitlements only if that is less costly than the cheapest way available to him of reducing emissions. Likewise, the participant offering the entitlement for sale or rent will require a price for the entitlement that exceeds the costs of producing a saleable entitlement - i.e. that exceeds the costs of abatement in his territory. Thus, a tradeable entitlements system produces any given level of global abatement at least cost, even though no single participant in the system is in a position to know, or evaluate the cost, of all opportunities for abatement.

64. Experience at the national level with tradeable emission entitlements has demonstrated that the cost savings of such a system as compared with traditional regulatory approaches can be quite large. In the United States, most estimates put the savings achieved by allowing emissions trading under the Clean Air Act at over $10 billion. The most telling feature of emission entitlement systems, however, is that, assuming the market for entitlements is competitive, the advantages described above can be secured in full whatever the initial distribution of entitlements. This is a significant characteristic, because it provides a means for tackling the development dimension of emission abatement in the context of a fully cost-effective system.

65. The initial allocation among Governments of emission entitlements could, on a basis related to generally agreed criteria, be undertaken in a way that would endow developing countries with more entitlements than required by present and prospective emissions, and developed countries with fewer entitlements than required by present emissions. In addition to providing cost-effective control, such a distribution would:

- Provide developing countries with room to expand emissions of greenhouse gases as required by their ongoing industrialization;

- Allow developing countries to sell or rent entitlements they do not presently require, thereby generating a flow of foreign exchange that could be used to finance emission-efficient investment;

- Provide incentives, both to developed and to developing countries, to introduce industrial techniques and patterns that minimize emissions. In the developed countries, introducing environment-friendly techniques would reduce the need to purchase entitlements from third countries. As regards developing countries, environment-friendly techniques would enable these countries to save emission entitlements so as to sell or rent them, thereby creating an additional source of development finance, including finance for the further purchase of environment-friendly technologies.

Other market-based instruments

66. In addition to tradeable emission entitlements (or permits), two main options for international emission control are an international emissions tax and external offsets. These market instruments seek to deter pollution by making it more expensive, so that those involved decide to reduce emissions to avoid the associated costs.

67. In the case of international emission taxes, revenues would be paid in proportion to emissions and redistributed in such a way as to ensure a net transfer from richer to poorer countries. The idea of external offsets is that a given actor (which could be a firm, industry, region or country) has an initial target, but is allowed to "offset" this by investing in measures to reduce emissions by an equivalent amount elsewhere. In the international context, external offsets would imply that countries with an agreed national emission target could meet this either by curtailing their own emissions to this level, or by investing elsewhere to reduce emissions so that the total of national emissions minus the amount saved by those external investments would meet the target. The idea would be to increase efficiency and flexibility by allowing countries to fund abatement in places where it might be cheaper than measures undertaken in their own country. The main attraction of external offset is that it would enable efforts to limit greenhouse gas emissions to be spread globally, without necessarily having a global agreement on commitments.

Future work

68. Paragraph 119 of the Cartagena Commitment states: "The Conference emphasizes that government intervention for the protection of the environment and the achievement of sustainable development should pay attention to, inter alia, control mechanisms that make use of market signals and generate additional financial flows. The Conference notes that the UNCTAD secretariat is undertaking studies on a possible global system of tradeable carbon emission entitlements". Subsequently, the terms of reference of the Ad Hoc Working Group on Investment and Financial Flows; Non-debt-creating Finance for Development; New Mechanisms for Increasing Investment and Financial Flows, established by the Trade and Development Board (thirty-eighth session, second part) require the Working Group, inter alia, "to explore new mechanisms aimed at increasing investment and financial flows involving equity and non-equity-based finance and other market-based instruments".

69. Accordingly, over the next biennium, the UNCTAD secretariat's work on tradeable emission entitlements will be aimed at two objectives: (1) to provide support for the implementation and further development of the Framework Convention on Climate Change, signed at Rio de Janeiro in June 1992; and (2) to contribute to the development of new innovative mechanisms for financing global environmental protection and sustainable development. These activities would build on the work already carried out by the secretariat in document UNCTAD/RDP/DFP/1. The work programme in this area covers the following: support for the implementation of CO_2 offset arrangements; new mechanisms for joint implementation of commitments utilizing tradeable CO_2 emission entitlements; costs and benefits of abatement; essential design requirements of a global system of tradeable carbon emission entitlements; model rules and regulations for a global CO_2 entitlement market.

D. Promoting the transfer, adaptation and generation of environmentally sound technologies (ESTs)

70. UNCTAD's present orientations regarding work in the field of environmentally sound technologies (ESTs) are set forth in the Cartagena Commitment. Paragraph 42 of the Commitment stresses, inter alia, the need for UNCTAD's intergovernmental machinery and the secretariat "to explore and promote policies aimed at generating, adapting and disseminating environmentally sound technologies". The importance of issues related to the transfer and development of ESTs has been further highlighted by Agenda 21 of the United Nations Conference on Environment and Development, Chapter 34, and by Principle 9 of the Rio Declaration on Environment and Development. In consonance with Trade and Development Board resolution 393 (XXXVIII), the terms of reference of the Ad Hoc Working Group on the Interrelationship between Investment and Technology Transfer includes the examination and encouragement of "new initiatives and exchange of experiences on investment and technology policies that are conducive to overcoming constraints and facilitating technology transfer through investment, and the generation, transfer and diffusion of technology, including environmentally sound technologies which have an impact on competitiveness and development".

71. In carrying out the above mandate, the work of the UNCTAD secretariat will be aimed at improving knowledge of the implications of ESTs for trade and development and reviewing the economic and commercial features of selected technologies, including their possible impact on developing countries' competitiveness and development.

Notes

1/ This work has benefited from financial support by the Government of the Netherlands. It has resulted in a study which will be published in early 1993.

2/ Paragraph 3.

3/ Paragraph 23.

4/ Terms of reference for the Standing Committee on Poverty Alleviation, paragraph 1/ (TD/B/1323 (vol. II)), paragraphs 1 and 2 (f).

5/ This work has benefited from financial support by the Government of the Netherlands.

6/ Development and international economic cooperation: trade and development.

7/ World Bank, World Development Report 1992, p. 138.

8/ World Bank, World Development Report 1977, p. 140.

9/ Qu Geping, "The review and prospects of eco-farming construction in China", China Environmental Science Press, 1991.

10/ It is expected that liberalization of world trade in agriculture in most cases will result in higher world market prices and export-led growth of agricultural production in developing countries. Environmentalists fear that trade liberalization will result in increased competition; increased use of fertilizers and pesticides; the expansion of land used for agricultural production (leading in some cases to deforestation); and a shift in agricultural production towards export products. On the other hand, the developing country agricultural producers' gains from increased access to export markets and from higher prices for their production provide better options for sustainable land management.

11/ OECD, Report by the Trade and Environment Policy Committees to the Meeting of the Council at Ministerial Level (COM/TD/ENV(92)31/REV.2).

12/ Report of the Commission of the European Communities to the United Nations Conference on Environment and Development, p. 81.

13/ See: A living environment, main proposals. The Swedish Government Bill 1990/91:90, p. 77.

14/ Agenda 21, paragraph 38.26.

15/ TD/B/1323 (Vol. II).

16/ Industrialized countries currently emit the largest quantity of pollutants into the global environment and are the major users of natural resources (Cartagena Commitment, para. 40). Developing countries do not have the resources to industrialize now and repair later. They can profit from the improvements in resource and environmental management being achieved in industrialized countries and so avoid the need for expensive clean-ups. Such technologies can also help them reduce costs and stretch scarce resources. And they can learn from the mistakes of developed countries. See: The World Commission on Environment and Development, Our Common Future, p. 215.

17/ See: Robert E.B. Lucas, David Wheeler and Hemamala Hettige, Economic Development, Environmental Regulation and the International Migration of Toxic Industrial Pollution: 1960-1988 in Patrick Low, editor International trade and the environment (Washington, World Bank, 1992).

18/ See: The World Commission on Environment and Development Our Common Future, p. 230.

19/ As part of a joint project with UNDP (see chapter III).

20/ Some firms that a decade ago established teams to research and develop innovative technologies to meet new environmental standards are today among the most competitive in their fields, nationally and internationally. See: the World Commission on Environment and Development, Our Common future, p. 212.

21/ There is concern that "dirty" industry could migrate to developing countries, taking advantage of lower environmental standards. Environmental costs, however, do not appear to be a significant factor in production location decisions, as only a small part of total production costs relate to environmental concerns. Studies have shown that few firms relocate for environmental reasons but rather do so because of comparative advantages in relation to labour and natural resources costs. While the movement of industry to take advantage of lower environmental costs may not be a significant problem currently, it may become significant if externalities are fully internalized.

22/ Another consideration is transaction costs. Where standards differ, the costs of doing business are likely to increase, as producers have to adapt to different requirements in different markets. Similarly, there could be economic costs if producers find themselves varying their products in ways that are sufficiently significant to deny them the benefits of economies of scale. These considerations suggest that harmonization can be helpful in certain circumstances. See: Latin American Economic System, Trade, Environment and the Developing Countries (SP/LC/XVIII.O/Di No.2).

23/ See: UNCTAD/UNDP workshop on sustainable development and trade (New York, 4-5 May 1992), Report of the meeting, Geneva, May 1992. This section draws heavily on that report.

24/ Environmental labelling programmes emphasize the relatively benign, i.e. environmentally less "costly" character of the products honoured with a label. The programmes are voluntary and open to both domestic and foreign suppliers. Nevertheless, environmental labelling may act as a barrier to trade for comparable products not receiving the label. Even if the criteria for granting lables may be the same for domestic and foreign suppliers, certain administrative procedures (for instance plant inspections) may in practice imply differences in treatment. The cradle-to-grave approach, which includes, inter alia, the consideration of production processes and methods and raw material use may, in practice, discriminate against developing countries. See: OECD, Environmental Labelling in OECD Countries, Paris, 1991.

25/ Over 15 countries will participate on the basis of conditions such as (i) government commitment and (ii) availability of national consultants or, preferably, research institutes. Funds will provide international and national experts to conduct the studies (project INT/92/207). The wider programme is also supported by the Government of the Netherlands and the International Institute for Sustainable Development in Canada (through the sponsoring of expert group meetings). A steering group has been established to give research advice. The GATT secretariat has accepted an invitation to nominate an official as member of the steering group.

26/ The programme seems very relevant in the context of the recent OECD report on trade and development, Report by the Trade and Environment Policy Committees to the Meeting of the Council at Ministerial Level (COM/TD/ENV(92)31/Rev.2). Referring to trade and environment the report recognizes that "what has become evident is the great importance and complexity of this interrelationship". According to the report "the work continuing in the GATT, in UNCTAD and within the UNCED framework is welcomed by the Trade and Environment Policy Committees as providing positive contributions to a better understanding of the issues in this field". The report calls for "closer co-operation in trade and environmental policy analysis with other international organizations, within their respective mandates and competences, including GATT, UNCTAD and the World Bank".

27/ In decision 384 (XXXVII), of 12 October 1990, the Trade and Development Board requested the secretariat "... in connection with the efforts to promote dialogue within UNCTAD on the interlinkages between environmental and trade policies, to adjust the UNCTAD Trade Control Measures Information System to monitor environmental regulations for possible protectionism and to monitor non-tariff measures which have a bearing on the environment". This decision of the Board was reaffirmed by the General Assembly in its resolution 45/210 on 21 December 1990.

28/ The development of a pilot version has been possible thanks to a contribution by the Government of the Netherlands.

29/ See: UNCTAD, A Users' Manual for TRAINS (UNCTAD/DDM/3).

30/ Material used in this section is drawn from the UNCTAD secretariat's study Combating Global Warming: Study on a Global System of Tradeable Carbon Emission Entitlements, UNCTAD/RDP/DFP/1. The reader is referred to that study for a fuller presentation of the analysis and arguments. The study benefited from the financial support of the Governments of the Netherlands and Norway.